Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Village Creek

Waterbody Segment at a Glance:

County: Madison
Nearby Cities: Fredericktown
Length of impairment: 0.5 miles
Pollutant: Nonvolatile Suspended Solids (NVSS)
Source: Mine La Motte Abandoned Mine Lands (AMLs)


State map showing location of watershed

TMDL Priority Ranking: High

Description of the Problem

Beneficial uses of Village Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health Associated with Fish Consumption

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- Standards for nonvolatile suspended solids (NVSS) are found in the general criteria section of the WQS, 10 CSR 20-7.031(3)(A) and (C) where it states:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses

Background Information and Water Quality Data

Nonvolatile suspended solids (NVSS) are mineral particles such as clay, silt, sand or assorted sized pieces of rock or other non-organic materials. These particles usually enter streams via erosion of soils or other materials from the surface of the land. Other solids such as those that are discharged from sewage treatment plants are organic solids and are referred to as volatile suspended solids (VSS). Visual observation of Village Creek over the past 15 years by the Department of Natural

Resources has shown instream deposition of mine tailings due to erosion from a mine tailings pile adjacent to the creek. The sediment this adds to the creek is harmful to aquatic life because it covers the streambed, reduces spawning habitat for fish and smothers fish eggs and small aquatic organisms.

Mine La Motte is the oldest lead mining area west of the Mississippi River, beginning operations in 1720. Lead mined at Mine La Motte has been used for the manufacture of bullets for every military action of the United States from the American Revolution to the Korean Conflict. The area was of such vital strategic importance during the Civil War that, following the Battle of Fredericktown, Union forces destroyed the furnaces at Mine La Motte rather than allow lead-producing capabilities fall into Confederate hands.

In February 2000, the United States Environmental Protection Agency (EPA) collected samples from the Mine La Motte tailings pile. Those samples showed that the tailings contained lead ranging from 490 to 3,970 parts per million (ppm). The residential "action level" set by the EPA is 400 ppm. At that level or higher, the EPA comes in and performs a lead cleanup of the property to protect citizens' health. The EPA judged that lead levels in the Mine La Motte tailings did not warrant a response action at that time, but that sampling would continue to determine if lead levels at that site pose any risk to human health or the environment.

In 2003, the department analyzed sediments in Village Creek for heavy metal contamination. Results are given in the table below. Levels of lead exceeded the recommended maximum levels to protect aquatic life. No other metals that were measured exceeded the recommended maximum levels.

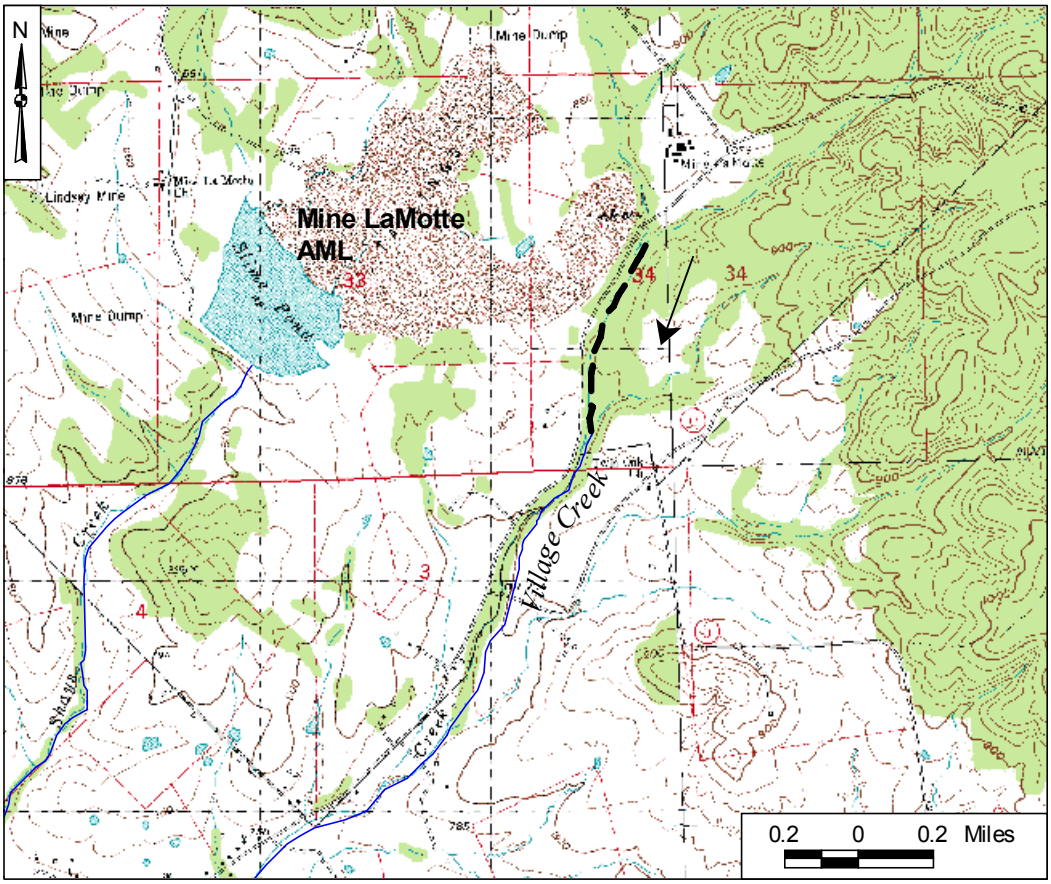
Table 1. Concentrations of Heavy Metals in the Sediments of Village Creek near Fredericktown, MO, in 2003, and Recommended Maximum Safe Levels for Aquatic Life (mg/Kg)

	Al	As	Cd	Cu	Ni	Pb	Zn
Village Creek	5,690	32.4	0.06	15.9	22.5	**104**	39.3
PEL (Max. Safe Level)*	60,000	48	3.2	100	33	82	540

*PEL = Probable Effect Level - the level of metal contamination at which adverse effects on the aquatic biota can be expected.

The department has scheduled additional studies on Village Creek downstream of Mine La Motte in 2005 that will assess the aquatic invertebrate community and the degree of fine sediment deposition in the stream.

Map of Impaired Segment of Village Creek in Madison County, Missouri



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